

Stress Incontinence in Women

Treatment by Retropubic Urethrovesical Suspension

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IF A WOMAN unconsciously leaks urine while coughing or sneezing she has stress incontinence. This must be carefully distinguished from the uncontrollable desire to void of *urgency* incontinence, and from the constant dribbling of fistulous or *overflow* incontinence. Each variety of incontinence requires a specifically different treatment, and the commonest cause for failure of operative cures is faulty diagnosis.

Stress incontinence is typically a disease of parous, postmenopausal women, but its incidence in this group is unknown. About 5 per cent of nulliparous¹⁶ or recently parous⁵ women admit to this embarrassing symptom.

Recent roentgenologic studies demonstrated the relationship between normal micturition and stress incontinence. During micturition, the upper urethra dilates, descends, and rotates posteriorly so that the posterior urethral wall aligns with the base of the bladder (Figure 1). Voluntary traction of the pubococcygeus and the striated peri-urethral muscles constrict, elevate and rotate the urethra to its original position, and the flow of urine is cut off (Figure 1). Continence is maintained by the smooth muscle tonus of the urethra and by the equalized pressure within the vesical spheroid. In patients with stress incontinence, the urethra is chronically dilated and posteriorly rotated, so that any sudden rise in intravesical pressure is transmitted to the cone-shaped neck of the bladder and urine is ejected with hydraulic ram-like force through the lower urethra. The critical pathologic changes of stress incontinence are intrinsic to the bladder neck and upper urethra, and are not related to the competence of the pelvic supporting structures. It is not paradoxical, therefore, that some patients with good vaginal support may be incontinent, while others, despite complete prolapse of the uterus and bladder, remain dry.

Cure of stress incontinence requires elevation, anterior rotation, and constriction of the upper urethra. Perineal exercises can do this, and excellent

• Twenty-four retropubic urethrovesical suspension operations were performed in a five-year period. Twenty-one of the patients were satisfied with the results, although the objective success of the operation did not always correlate with subjective relief of symptoms. The commonest *apparent* cause for failure was the coincidence of urgency with stress incontinence, and the few *true failures*, due to secondary relaxation of the paraurethral supports, were often mitigated by compensatory learning on the part of the patients, many of whom remain blissfully unaware of the underlying weakness.

The retropubic urethrovesical suspension operation is simple, effective, and free of complications. It is indicated as a primary procedure whenever a vaginal operation has failed to cure (or, worse, has caused) stress incontinence. It is advised as a complementary procedure for women with a secondary complaint of stress incontinence who must undergo laparotomy for other cause.

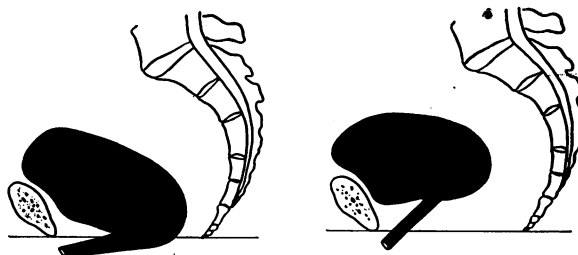


Figure 1.—*Left*: During micturition the upper urethra dilates, descends and rotates posteriorly so that the posterior urethral wall aligns with the base of the bladder; then (*right*), voluntary traction of the pubococcygeus and the striated periurethral muscles constrict, elevate and rotate the urethra to its original position and the flow of urine is cut off.

results are obtained by those incontinent patients who, having at least fair musculofascial bladder support, can learn to contract the levator ani muscles. When the pelvic support is poor, plastic vaginal repair and suburethral plication are indicated, and results are good in about 85 per cent of cases. For the incontinent patient with good support who does not respond to perineal exercises, for the remaining 15 per cent of patients in whom vaginal plastic operations have failed, and for incontinent patients in whom laparotomy is indicated for coincident disease, suprapubic urethrovesical suspension is the procedure of choice.

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Presented before the Section on Obstetrics and Gynecology at the 85th Annual Session of the California Medical Association, Los Angeles, April 29 to May 2, 1956.

HISTORICAL BACKGROUND

This operation has an interesting history. In cases in which suburethral plication did not cure stress incontinence, Bonney² sutured the anterior wall of the bladder to the back of the rectus muscle. Hepburn⁸ used the same technique to elevate the prolapsed urethra. Furniss⁴ plicated the urethra from above and suspended it by anchoring one of the plicating suture ends to the rectus muscle. In 1942, Williams²³ sutured the side of the bladder and the underlying fascia along the top of the symphysis, and he reported nine such operations in 1947. With the intention of exaggerating the urethrovaginal angle for the cure of stress incontinence, Perrin¹⁸ sutured the paraurethral fascia and the bladder neck to the back of the symphysis and to the abdominal fascia. He performed the first operation in March, 1944, and reported two cases in 1945. A similar operation was performed in the United States in June, 1944, and the result of 38 such operations for stress incontinence in women was reported by Marshall, Marchetti and Krantz¹³ in 1949. The name Marshall-Marchetti is commonly applied to this operation in the United States, but since the historic origin is complex, since the omission of Krantz's name seems unjustified, and since descriptive terms are generally preferred to synonyms, the author prefers *retropubic urethrovaginal suspension* despite its voluble qualities. Table 1 summarizes published experiences with this operation. Mulvany¹⁴ expressed belief that retropubic dissection alone, rather than the suspending sutures, is the curative factor, while Ball¹ reported he got best results by combining vaginal plication with retropubic suspension. Neither of these modifications has as yet been extensively tried.

MATERIAL AND METHODS

In the five-year period 1951-1955, the retropubic suspension operation was performed on 24 women with stress incontinence. Nineteen were clinic patients and five were private patients. In 12 patients whose primary complaint was stress incontinence, only the suspension operation was performed. In 12 other patients undergoing intraperitoneal procedures, urinary incontinence was a secondary complaint. The primary and secondary groups differed in important ways (Tables 2 and 3). The secondary operations were performed because of increasing familiarity with and pleasing results of the primary operations. Besides this, the degree of incontinence was less, the patients were younger, and the operations were more recent in the secondary as compared with the primary group.

Three patients were nulliparous, but had neither spina bifida nor neurologic disease. A fourth had

TABLE 1.—Published Data by Various Investigators on Results of Retropubic Urethrovaginal Suspension

Author	Year	Cured	Improved	Failed	Total
Perrin ¹⁸	1945	2	—	—	2
Labry ¹¹	1948	8	3	1	12
Marshall ¹³	1949	28	7	3	38
Marchetti ¹²	1949	12	—	—	12
Pieghdal ¹⁰	1949	4	—	1	5
Gillam ⁷	1952	19	—	1	20
Doolittle ³	1952	5	—	1	6
Gallaher ⁶	1952	10	—	1	11
Ullery ²⁰	1953	22	1	1	24
Paxon ¹⁷	1953	4	—	—	4
Ward ²¹	1953	6	—	—	6
Nelson ¹⁶	1953	34	4	2	40
Käser ¹⁰	1953	12	4	—	16
Jeffcoate ⁹	1954	18	—	3	22*
Weinberg ²²	1955	22	4	1	33*

* Includes patients lost to follow-up.

TABLE 2.—Results in Cases in Which Urethrovaginal Suspension Was Done as a Primary Procedure

Month and Year	Age (Yrs.)	Follow-up (Mos.)	Subjective			Objective	
			Failed	Improved	Cured	Failed	Cured
3-51	67	66	—	X	—	X	—
4-51	41	36	—	X	—	X	—
6-52	75	22	X	—	—	—	X
7-52	61	23	X	—	—	—	X
8-52	69	22	—	—	X	X	—
8-52	65	22	—	—	X	X	—
1-53	57	21	—	—	X	—	X
7-53	74	11	—	—	X	X	—
11-53	42	8	—	—	X	—	X
11-53	35	2	—	—	X	—	X
6-54	41	12	—	—	X	—	—
10-54	67	12	—	—	X	—	X

TABLE 3.—Results in Cases in Which Urethrovaginal Suspension for Incontinence Was Secondary to Another Intraperitoneal Procedure

Month and Year	Age (Yrs.)	Follow-up (Mos.)	Subjective			Objective	
			Failed	Improved	Cured	Failed	Cured
3-51	45	40	—	X	—	X	—
7-52	42	24	—	—	X	—	X
12-53	64	24	X	—	—	X	—
1-54	51	10	—	—	X	—	—
2-54	50	7	—	—	X	—	X
2-54	50	10	—	X	—	—	X
4-54	43	6	—	—	X	—	X
11-54	47	4	—	—	X	—	X
3-54	43	4	—	—	X	—	X
2-55	47	9	—	X	—	—	X
3-55	44	4	—	—	X	—	X
8-55	65	3	—	—	X	—	X

a huge anterior meningocele with both overflow and stress incontinence. Bladder support was normal in all patients, 12 having undergone previous vaginal repairs. Seven patients had been incontinent for ten years or more, and in 15 others the symptoms had lasted more than five years. In ten patients, urgency complicated the stress incontinence, one had infected urine, and in six mild trigonitis was noted on cystoscopic examination.

Urologic consultation and treatment were given to fifteen patients preoperatively. Perineal exercises were tried in only five. Local estrogens were given to five patients and antibiotics to four with no apparent benefit.

A test similar to that advocated by Bonney was performed preoperatively in all patients. With the patient standing, an open curved clamp was held against the anterior wall of the vagina in such a way that the urethra was held against the back of the symphysis without compression. Inhibition of incontinence on cough during this test was a prerequisite to the suspension operation.

Marchetti's¹² operating technique was employed. For the first ten operations chromic catgut was used, but later this was replaced by nonabsorbable material in the hope that the support would be more lasting. After nine successful operations a cotton suture was inadvertently stitched through the bladder wall, causing persistent postoperative cystitis until it was removed. A low transverse abdominal incision is preferred for this operation. Drains are used only for the rare oozing incisions, and retention catheters may be removed within 24 hours. Six patients required a few subsequent catheterizations.

RESULTS

All 24 patients responded to a detailed questionnaire concerning symptomatic improvement. In addition, 16 patients returned for a special postoperative recheck, at which time residual urine was examined for volume and for sediment, the bladder capacity was determined, and with the bladder still full, the patient was tested for incontinence in a standing position on coughing and straining. Subjective responses are compared with objective testing in Table 2. Patients were deemed subjectively improved when, following operations, they could resume normal activities without perineal pad protection, even though occasional stress incontinence might have recurred. No such intermediate results could be distinguished on objective testing, since the patients either leaked or remained dry. The improvement in results of the early as compared with the later operations is more apparent than real. As indications for the operation were broadened, younger patients with less severe, less chronic incontinence were included. The period of followup is shorter and the proportion of secondary cases is greater in the later than in the earlier cases. On the other hand, the later patients were better selected and the operations were perhaps technically superior to the earlier.

No patient was made worse by this operation, a distinction not shared by the vaginal approach. Seven operations were objective failures, yet six of

the patients considered themselves symptomatically cured or greatly improved. Bladder neck and urethral support remained good or fair in all but one of the seven patients. Contrariwise, two patients felt the operation was a complete failure, and two were only improved, yet all four were dry on test. In five cases the success amounted to a therapeutic triumph, in that incontinence was a disabling complaint, previous treatment had failed, and after the operation the patient was cured. In five patients the operation neatly supplemented a major intraperitoneal operation, obviating the fatigue and inefficiency of the combined abdominal and vaginal approach and cured an important secondary complaint. Thus, ten of the 24 operations were entirely satisfactory in outcome subjectively and objectively, and 21 of the 24 patients were well satisfied with the result.

DISCUSSION

Considering the unusually difficult problems presented by this small group of patients, the results were remarkably good with this simple, physiological procedure. It is no longer necessary to follow blindly the try-and-try-again approach from below; in fact, more than one such vaginal approach is no longer indicated for stress incontinence. No operations of sling type were performed in the period reported upon, because the few patients who still had stress incontinence following the suspension operation were so improved they considered further operation unnecessary. Three patients were cured of stress incontinence, yet they were dissatisfied with the suspension operation because urgency incontinence remained to spoil the effect. In reviewing the histories in those three cases, the presence of urgency was noted in addition to stress incontinence in each, and, no doubt, had the patient been carefully educated as to the difference, she would have been more appreciative of the partial cure. The suspension operation is by no means contraindicated in patients with stress incontinence who also suffer from urgency. Both should be treated in the most effective manner.

The apparent paradox of the patient who believes herself cured, although stress incontinence remains on test, can best be explained by assuming that she has learned to empty her bladder before its functional capacity is exceeded. In four of the seven patients in whom incontinence recurred, some return of bladder neck relaxation was noted, and the Bonney test corrected the incontinence again.

Exercises have been advised, and although they are of some help, few of the older women are highly enough motivated, or have the persistence, to obtain really curative results with exercises alone. For the partial operative success, exercises are a worthwhile supplement.

The operation is so free of complications it is an excellent addition to other abdominal procedures, and perhaps serious stress incontinence can be entirely prevented in those women who undergo abdominal operations if the surgeon remembers to take a careful history, uses the Bonney test liberally, and spends the additional few moments necessary to suspend the urethra.

Because of the variety of ways of reporting it is difficult to compare the results reported here with those of other clinics. Reports which do not differentiate subjective from objective results cannot give a true picture of the benefits and weaknesses of this operation.

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